

WHAT IS CLAIMED IS

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1. An optical scanning device comprising:

a light source emitting a light beam;

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10 a scanning optical unit deflecting the light beam from the light source and focusing the deflected light beam to form a light spot on a scanned surface, the scanned surface being scanned by the light beam from the scanning optical unit;

a temperature detection unit detecting a temperature of the scanning optical unit and its neighboring locations; and

15 a temperature compensation unit adjusting a focal-point position of the light beam on the scanned surface in accordance with a change in the temperature detected by the temperature detection unit, the temperature compensation unit adjusting the focal-point position of the light beam by directly varying a focusing effect of a corrector lens on the light beam from the light source by a
20 controlled amount of movement of the corrector lens along its optical axis that corresponds to the temperature change.

2. The optical scanning device according to claim 1, wherein the temperature compensation unit adjusts the focal-point position of the light beam with respect to at least one of a main scanning direction and a sub-scanning direction in accordance with the temperature change.

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3. The optical scanning device according to claim 1, wherein the temperature compensation unit includes a memory that stores a table defining a relationship between the temperature change and a corresponding focal-point deviation of the light beam on the scanned surface, the temperature compensation unit adjusting the focal-point position of the light beam based on the focal-point deviation read from the memory in response to the temperature change.

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4. The optical scanning device according to claim 1, wherein an integrated circuit board having a function that is different from a temperature compensation function is provided, the temperature detection unit being integrally formed on the integrated circuit board.

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5. An optical scanning method comprising the steps of:
emitting a light beam from a light source;
deflecting the light beam from the light source by a scanning
optical unit;

5 focusing the deflected light beam by the scanning optical unit
to form a light spot on a scanned surface, the scanned surface being
scanned by the light beam from the scanning optical unit;

detecting a temperature of the scanning optical unit and its
neighboring locations; and

10 adjusting a focal-point position of the light beam on the
scanned surface in accordance with a change in the temperature
detected in the detecting step, the focal-point position of the light
beam being adjusted by directly varying a focusing effect of a
corrector lens on the light beam from the light source by a
15 controlled amount of movement of the corrector lens along its
optical axis that corresponds to the temperature change.

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6. An image forming apparatus in which an optical scanning
device is provided, the optical scanning device comprising:

a light source emitting a light beam;

a scanning optical unit deflecting the light beam from the light
25 source and focusing the deflected light beam to form a light spot on

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a scanned surface, the scanned surface being scanned by the light beam from the scanning optical unit;

a temperature detection unit detecting a temperature of the scanning optical unit and its neighboring locations; and

5 a temperature compensation unit adjusting a focal-point position of the light beam on the scanned surface in accordance with a change in the temperature detected by the temperature detection unit, the temperature compensation unit adjusting the focal-point position of the light beam by directly varying a focusing effect of a
10 corrector lens on the light beam from the light source by a controlled amount of movement of the corrector lens along its optical axis that corresponds to the temperature change.

15 7. An optical scanning device comprising:

a light source unit having a plurality of light sources emitting multiple light beams;

20 a scanning optical unit deflecting the multiple light beams from the light sources at a single location and focusing the deflected light beam to form a light spot on a scanned surface, the scanned surface being scanned by the light beam from the scanning optical unit;

25 a temperature detection unit detecting a temperature of the

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scanning optical unit and its neighboring locations; and

a temperature compensation unit adjusting each of a main-scanning-direction focal-point position, a sub-scanning-direction focal-point position and a sub-scanning-direction beam pitch related to the light beam on the scanned surface in accordance with a change in the temperature detected by the temperature detection unit.

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8. The optical scanning device according to claim 7, wherein the temperature compensation unit adjusts the main-scanning-direction focal-point position of the light beam by directly varying a focusing effect of a first corrector lens on the light beam from the light source by a controlled amount of movement of the first corrector lens along its optical axis that corresponds to the temperature change, adjusts the sub-scanning-direction focal-point position of the light beam by directly varying a focusing effect of a second corrector lens on the light beam from the light source by a controlled amount of movement of the second corrector lens along its optical axis that corresponds to the temperature change, and adjusts the sub-scanning-direction beam pitch of the light beam by moving the light source unit along its optical axis by a controlled amount that corresponds to the temperature change.

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9. The optical scanning device according to claim 7, wherein the temperature compensation unit includes a memory that stores a first map defining a relationship between the temperature change and a corresponding main-scanning-direction focal-point deviation of the light beam, a second map defining a relationship between the temperature change and a corresponding sub-scanning-direction focal-point deviation of the light beam, and a third map defining a relationship between the temperature change and a corresponding sub-scanning-direction beam-pitch deviation of the light beam,

the temperature compensation unit adjusting the main-scanning-direction focal-point position, the sub-scanning-direction focal-point position and the sub-scanning-direction beam pitch based on the respective deviations of the first, second and third maps read from the memory in response to the temperature change.

10. The optical scanning device according to claim 7, wherein the temperature detection unit includes a plurality of temperature sensors provided at different internal locations within the optical scanning device, the temperature detection unit detecting the temperature of the scanning optical unit and its neighboring locations by obtaining a weighted average of respective temperatures sensed by the plurality of temperature sensors.

11. An optical scanning method comprising the steps of:
emitting multiple light beams from a plurality of light sources
contained in a light source unit;

5 deflecting the multiple light beams from the light sources at a
single location by a scanning optical unit;

 focusing the deflected light beam by the scanning optical unit
to form a light spot on a scanned surface, the scanned surface being
scanned by the light beam from the scanning optical unit;

10 detecting a temperature of the scanning optical unit and its
neighboring locations; and

 adjusting each of a main-scanning-direction focal-point
position, a sub-scanning-direction focal-point position and a sub-
scanning-direction beam pitch related to the light beam on the
scanned surface, in accordance with a change in the temperature
15 detected in the detecting step.

20 12. An image forming apparatus in which an optical scanning
device is provided, the optical scanning device comprising:

 a light source unit having a plurality of light sources emitting
multiple light beams;

25 a scanning optical unit deflecting the multiple light beams
from the light sources at a single location and focusing the deflected

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light beam to form a light spot on a scanned surface of a
photosensitive medium, the scanned surface being scanned by the
light beam from the scanning optical unit;

5 a temperature detection unit detecting a temperature of the
scanning optical unit and its neighboring locations; and

a temperature compensation unit adjusting each of a main-
scanning-direction focal-point position, a sub-scanning-direction
focal-point position and a sub-scanning-direction beam pitch related
to the light beam on the scanned surface in accordance with a change
10 in the temperature detected by the temperature detection unit.

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